

MULTIMEDIA



UNIVERSITY

STUDENT ID NO

--	--	--	--	--	--	--	--	--	--

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 1, 2019/2020

TCP2201 – Object Oriented Analysis and Design

(All Sections / Groups)

18 Oct 2019
9.00 AM– 11.00AM
(2 Hours)

INSTRUCTIONS TO STUDENT

1. Answer **ALL** questions.
2. This question paper has 7 printed pages excluding the front cover.
3. Please print all your answers in the answer booklet provided.

QUESTION 1 [25 marks]

<i>GeometricObject</i>
- color: String - filled: boolean - dateCreated: java.util.Date
GeometricObject() # Geometric Object(color: String, filled: boolean) + getColor(): String + setColor(color: String): void + isFilled(): boolean + setFilled(filled: boolean): void + getDateCreated(): java.util.Date + toString(): String + <i>getArea(): double</i> + <i>getPerimeter(): double</i>

- a) Implement using Java programming language a new Triangle class that extends the abstract GeometricObject class shown above. The toString() must be overridden to show the three sides of a triangle.

[12 marks]

- b) Write a test program using Java programming language that:-

- i. Creates a Triangle object with 3 sides and set the color and filled properties.

[6 marks]

- ii. Displays the three sides (using indirect call to toString()), area, and perimeter.

[7 marks]

Note: please write one program to answer b i) and b ii)

Continued

QUESTION 2 [25 marks]

- a) There are many projects are evolutionary or maintenance projects, involving work on legacy systems. List 2 types of maintenance project and briefly explain each of it. [4 marks]
- b) Company R needs to make functional enhancements to the system in addition to the activities to increase the system's performance even when the changes have not been suggested by faults. This includes enhancing both the function and efficiency of the code and changing the functionalities of the system as per the users' changing needs. Which maintenance project company R needs? [4 marks]
- c) Typical requirements and specification of software projects navigates 6 phases. Based on the requirement given by customer, Mr. Stanley and his team design the software using Artificial Intelligence technology. Which phase Mr Stanley and his team are going through? Explain your reason. [4 marks]
- d) Identify the use-cases and actors in the software description below and draw the resulting UML use-case diagram. [13 marks]

You are developing a costume rental software system for a store. The details of the software portion are as follows:

- Rents only costumes. The store does not sell anything
- Each customer has to register with membership and must login to perform transactions (e.g. search, select, book the costume, etc.)
- The store takes RM200 as registration deposit
- The deposit is refunded when user cancel their membership.
- Employees handle rental transactions made by customers.
- Employees generate the bill.
- Customer make payment for the bill.
- Employees also handle the updating of information on available costumes.
- Employees and managers monitor sales performance by viewing daily and monthly logs respectively

Continued

QUESTION 3 [25 marks]

- a) Company A would like to build a mobile platform application. According to the principles of better software design, software should be designed with the principles of portability, testability, flexibility and reusability. Based on these principles, choose three (3) to briefly explain and how it would affect the development of a mobile platform application.

[6 marks]

- b) Draw a class diagram to represent the statements.

“A school hires many teachers but a teacher only works at one school. Each school has a name and address while teacher have a name and salary”.

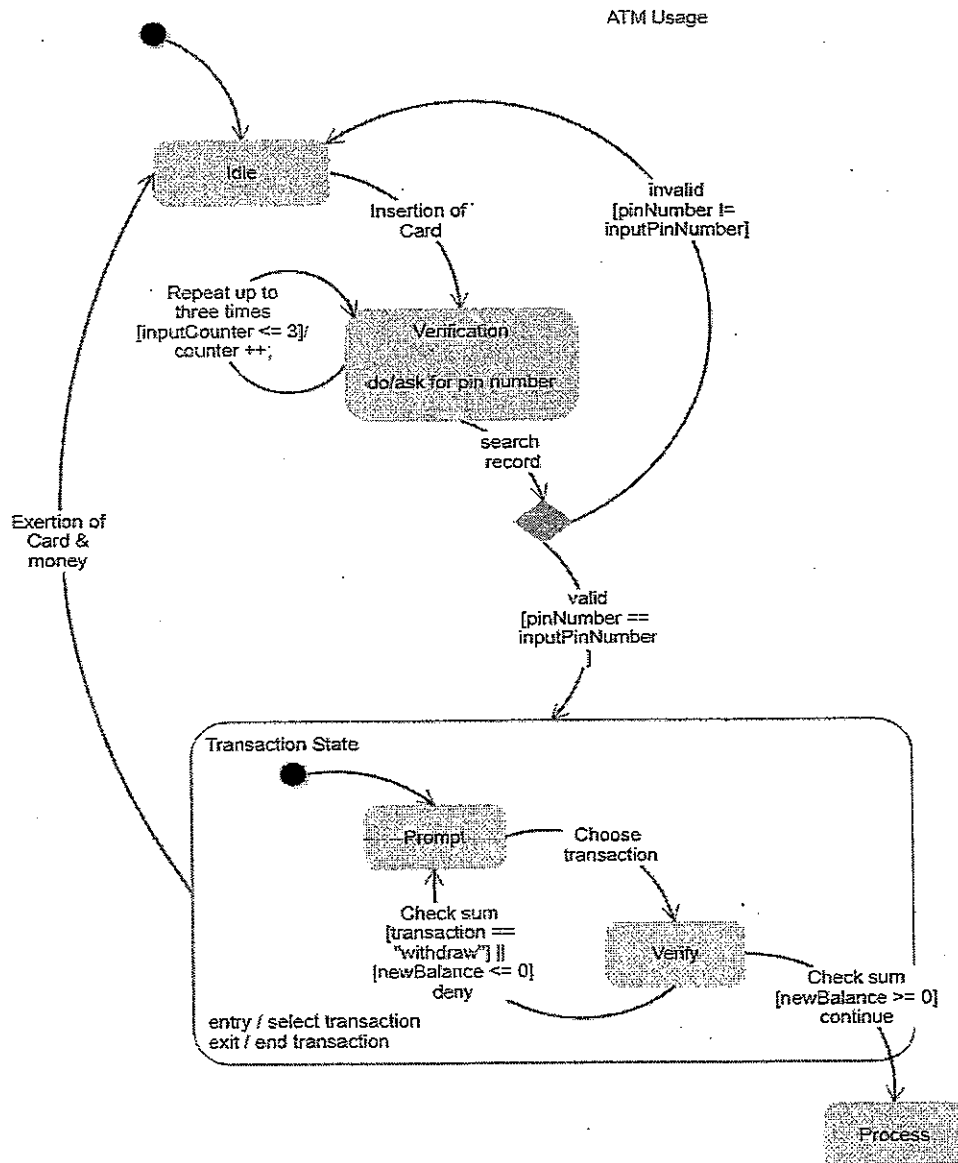
[2 marks]

Continued

c) Figure below indicates the State Diagram for the ATM software of a bank.

[6 marks]

- How many states exist in the ATM software? [1 mark]
- What are the states? [2 marks]
- What is a *guard*? [1 mark]
- Under what conditions does the user enter the transaction stage? [1 mark]
- When can the transaction state transit to process stage? [1 mark]



Continued

- d) Convert the following Java code into the corresponding UML diagram. Be sure to specify all the methods and constructors fully for full marks.

[11 marks]

MyClass.java:

```
class MyClass
{
    private String name;

    public MyClass(String name)
    {
        this.setName(name);
    }
    public void setName(String name)
    {
        this.name = name;
    }
    public String getName()
    {
        return name;
    }
}
```

MyChild.java:

```
import java.util.HashSet;
class MyChild extends MyClass
{
    private HashSet<MyClass> obj1;

    public MyChild(String name)
    {
        super(name);
        obj1 = new HashSet<MyClass>();
    }
    public boolean addClass(MyClass obj)
    {
        return obj1.add(obj);
    }
    public boolean deleteClass(MyClass obj)
    {
        return obj1.remove(obj);
    }
}
```

Continued

QUESTION 4 [25 marks]

- a) Please state what category these design patterns are in, and explain what each one means. Write your answer in a table like the one below.

[9 marks]

Pattern	Category	Explanation
Facade		
Prototype		
Iterator		

- b) In the Robota module, there are a number of global data variables that need to be shared and accessed by various objects of different classes in that module. These global data variables need to be managed and controlled in a central manner.

What design pattern would you use for this scenario? Explain why you would choose this design pattern – what the various parts correspond to in the pattern, and why this pattern would solve the problem. You are not required to provide a class diagram, but you may use one in your explanation if you want to.

[6 marks]

Warning: No marks will be given if you do not explain why you chose this design pattern. If there is more than one possible design pattern, you must only choose one, and your explanation will partially determine if your choice is reasonable or not. If you name more than one, only the first one will be marked.

Write your answer in a table like the one below.

Design Pattern:
Explanation:

Continued

- c) You work for DMZ Sdn. Bhd., which is a supplier of factory machinery. PTT Perabot Sdn. Bhd. has decided to buy the XTP Sawline, which DMZ is the sole Malaysian supplier, *provided* that DMZ gets it to work with the TRO Control System they use in their factory. You have examined the TRO Control System API and found that the XTP Sawline has the functions that it needs, but unfortunately it uses a different API. So you need to solve the problem of getting the XTP Sawline to be able to be controlled by the TRO Control System.

What design pattern would you use for this scenario? Explain why you would choose this design pattern – what the various parts correspond to in the pattern, and why this pattern would solve the problem. You are not required to provide a class diagram, but you may use one in your explanation if you want to.

[6 marks]

Warning: No marks will be given if you do not explain why you chose this design pattern. If there is more than one possible design pattern, you must only choose one, and your explanation will partially determine if your choice is reasonable or not. If you name more than one, only the first one will be marked.

Write your answer in a table like the one below.

Design Pattern:
Explanation:

- d) When is Model-View-Controller useful? Why is it useful?

[4 marks]

Write your answer in a table like the one below.

When:
Why:

End of Page